Efficiency and Effectiveness Analysis
Decision Item Request FY2002-03

Department: Personnel & GSS

Priority Number: 1 of 15

Long Bill Group/Division: Colorado Government Technology Services
Network Services

Request Title: Multi-Use Network Rate Implementation

Tracking Number: 142

Summary of Requested Alternative:

This request is for a statewide decision item of $3,051,574 (total funds) for FY 2002-03. The attached spreadsheet outlines the distribution of this request by department with funding splits. Each department has submitted a corresponding Schedule 6 providing more detail on the affected line items.

This additional funding is necessary for departments to support the implementation of statewide Multi-Use Network (MNT). Failure to fund this request will jeopardize the MNT project. This would adversely impact economic development in local communities, continue the State's fragmented network purchasing practices and reduce the interoperability of state networks. The net effect of this fragmentation is that many rural communities will be left out of the new economy while the State will be unable to provide the necessary foundation for e-government services such as distance learning, high-speed Internet services, and tele-medicine.

A supplemental request for FY 2001-02 will also be submitted.

Project Description:

The Colorado High-speed Digital Network is a public/private partnership to build a high-speed fiber-optic network for the State of Colorado. This network will provide a robust, seamless, statewide network for state agencies, local governments, non-profits organizations, private industry, and citizens. This network is the vendor-owned telecommunications network backbone that extends to each of Colorado's 64 county seats. This backbone is currently under construction by the Qwest consortium. The Multi-Use Network (MNT) is the portion of this network that is used by the State, local governments, and non-profits in order to aggregate total communication usage from many current networks into a single network. The State serves as anchor tenant to the Colorado High-speed Digital Network through the MNT. As anchor tenant,

the State's investment will help leverage the development of telecommunications infrastructure and expand delivery of advanced services to all geographic regions of the State.

The MNT was developed to improve the economic development opportunities statewide by creating the necessary incentive for the private sector to upgrade their equipment and capabilities in all areas of the State. Establishing a single statewide network that links all sites in the State with the same level of capabilities affords all Colorado citizens an equal opportunity to participate in the new economy such as distance learning and tele-medicine.

The primary objective of the MNT was to "bridge the digital divide" by providing:

- Broadband access to remote counties to promote economic development;
- Distance-learning opportunities for K-12 and local communities; and
- Potential long-term economic advantages that may result from aggregating state agencies' communications traffic into one statewide network.

Benefits and Advantages

The primary benefits and advantages of the MNT project can be summarized as follows:

- State agencies, schools, libraries, and institutions of higher education will no longer need to purchase telecommunication services in a piecemeal fashion. An aggregated network approach streamlines government by avoiding additional expenditures for duplicative state networks and provides the base infrastructure for electronic transactions with government.
- The MNT supports education both at the K-12 and Higher Education levels by establishing the infrastructure for interactive learning and distance learning.
- The MNT supports tele-medicine in rural communities.
- The MNT promotes rural economic development by extending telecommunications infrastructure to all corners of the State by encouraging private investment with the State acting as the anchor tenant.

At the completion of this project, Colorado will have established the required backbone for the e-government and access to broadband telecommunications at the county seat for public as well as private subscribers.

Many of the expected benefits of the statewide seamless high-speed broadband network (i.e., economic growth, increased productivity, enhanced connectivity) will be realized primarily by the private business sector, local governments, non-profit organizations, and the citizens of Colorado. These economic benefits are not quantified as a credit against the required deployment costs imposed on CGTS under the contract with the Qwest consortium.

Enabling Legislation

The MNT concept was developed in response to legislation passed by the General Assembly of the State of Colorado in 1996. The intent of Senate Bill 96-102 was to connect urban and rural communities across the State. From the start, the development of a public/private partnership was central to the concept of a MNT. The mandate for infrastructure development is aligned with local economic development based on the availability of advanced telecommunication services. Senate Bill 96-197 refers to the selection and operation of a Multiple-use Network. This is defined as a digital network capable of carrying integrated voice and video as well as text, graphics, and other electronic data between and among schools, public libraries, institutions of higher education, and state agencies. The Bill mandated that the State investigate and select one or more multiple-use networks to accomplish this.

The Multi-Use Network Task Force was assembled in October 1997 to evaluate the State's current and future use of telecommunications and to make strategic recommendations based upon its findings. This inter-departmental task force developed the "Strategic Plan for a Statewide Telecommunications Infrastructure." Based on that plan, the strategy for the MNT project is for state agencies, schools, libraries, and institutions of higher education to purchase telecommunication services in a coordinated fashion and to aggregate the existing telecommunications traffic. In addition, local governments and municipalities will join the MNT through the Community Based Access Grant Program (Beanpole grants) created by House Bill 99-1102. The Beanpole grants are designed to provide incentives to local communities to aggregate their own telecommunications demands and tie into the MNT using the closest ANAP, creating yet higher demand for network services.

Executive Order

On January 12, 2000, Governor Owens issued Executive Order B0201. This Order requires state agencies, departments, institutions, including higher education institutions, to migrate their telecommunications network and traffic to the MNT. The Executive Order re-creates the MNT Task Force with the responsibility to ensure aggregation of the State's purchases for telecommunication services and to promote standards for compatibility of equipment and software among all state agencies. The Department of Personnel is given the overall responsibility to implement and operate the MNT with oversight by the Task Force.

Project Partners/Contract

Qwest and subcontractors (CenturyTel, Phillips County Telephone Company, Eastern Slope Telephone Company, Citizens Communications, and Cisco Systems) are the awarded private partners for the project who are building the high-speed network. In June 2000, the State entered into a contract with Qwest to deploy the network. This contract requires Qwest to engineer, test, and deliver the network configuration for the Colorado High-speed Digital Network, including the State's MNT. This infrastructure will be owned, managed, and monitored by Qwest.

The State of Colorado is the anchor tenant partner and as such, uses the significant aggregated telecommunications requirements of state government agencies as the leverage investment for extension of telecommunication capabilities and advanced services into all geographic areas of the State. Both the legislation and the contract revolved on the concept that the State would assume the role of anchor tenant to provide incentives for a public-private partnership that would bring advanced telecommunication services to all parts of Colorado. This has not come without additional costs to the State. The State contracted to lease a minimum of 20 megabits of bandwidth to every ANAP in the State. The State also contracted to pay for the services to maintain the necessary switches at the ANAPs.

Implementation Phases

The project will be conducted in three one-year phases (Fiscal Year 2000-01 to Fiscal Year 2002-03) in which 70 ANAPS or Aggregated Network Access Points will be implemented across the state. An ANAP is defined as a minimum of 20 megabits of access capability for state government network users in an area. This service will be delivered over the new fiber optic network utilizing ATM (Asynchronous Transfer Mode) technology. Forty-three ANAPS have been implemented in Phase I; an additional eleven ANAPS will be implemented in Phase II, year 2002; and the final sixteen ANAPS will be implemented in Phase III, year 2003. The counties below are listed alphabetically within each phase.

- Phase I ANAPS: Completed – Adams, Alamosa, Arapahoe, Baca, Bent, Boulder, Broomfield, Clear Creek, Crowley, Delta, Denver (4 sites), Douglas, Eagle, El Paso, Elbert, Fremont, Garfield (2 sites), Gilpin, Gunnison, Huerfano, Jefferson, La Plata, Larimer, Las Animas, Lincoln, Logan, Mesa, Montezuma, Montrose, Morgan, Otero, Pitkin, Prowers, Pueblo, Sedgwick, Summit, Washington, Weld, and Yuma.

- Phase II ANAPS: Year 2001– Chaffee (2 sites), Conejos, Costilla, Custer, Dolores, Grand, Moffat, Phillips, Routt, Saugache.

- Phase III ANAPS: Year 2002 – Archuleta, Cheyenne, Hinsdale, Jackson, Kiowa, Kit Carson, Lake, Lincoln, Mineral, Ouray, Park, Rio Blanco, Rio Grande, San Juan, San Miguel, Teller.

MNT Billing and Rates

The statewide MNT project has resulted in changes in some telecommunications rates, the elimination of some rates, and the addition of other rates:

- As a result of the MNT contract, distance-sensitive “backhaul” charges for connecting to the statewide backbone network have been virtually eliminated.

- The charges of 22.58 percent of tariff for frame circuits and 15.58 percent of tariff for ATM circuits have been replaced with a 23 percent Colorado Digital-Divide Elimination Fund (CDEF) charge. CDEF covers a portion of the MNT contractual fees, including Qwest project management fees, Aggregated Network Access Point (ANAP) fees, state core switch

(MGX) maintenance and management fees, LATA Crossing, edge and super ANAP circuits, and ISP-layer three development and maintenance fees.

- There is a new charge for edge sites that covers 24 x 7 maintenance and monitoring services to ensure the network remains operational and to provide customized reporting and problem determination. Customers using edge site equipment to lower their circuit costs will be charged the actual monthly cost for maintaining and monitoring the equipment.

- Customers with circuits terminating at a Colorado Government Technology Services (CGTS) aggregation site will still be assessed a port and link (hookup) charge to that site.

- There have been substantial reductions in ISDN and PRI digital trunk charges.

The net result is an entirely new model for telecommunications pricing throughout Colorado. By virtually eliminating backhaul charges for *all* telecommunications customers, MNT will help bring economic development to every county in Colorado – not just for MNT users, but for local governments, businesses, and private citizens.

Pursuant to Section 24-30-908, C.R.S., MNT rates must not only cover the actual cost of providing telecommunication service, but must be competitive with commercial rates. This is especially critical to ensure that MNT can attract public-sector customers outside of state government. Those customers are not obligated to use the MNT, and therefore, substantial rate disparities in comparison to other offerings will drive customers away from the network. A loss of customers would seriously impair the State's ability to offer a seamless high-speed broadband network to all corners of the State.

Problem or Opportunity Definition:

The Colorado Government Technology Services (CGTS) division, working in cooperation with state departments, estimated the MNT costs for each department. State agencies cannot absorb the expected MNT costs within existing budgets. It is necessary to align departmental appropriations with expected costs to ensure the success of the MNT and to ensure that the State is able to meet contractual obligations with Qwest.

Available Alternatives:

<u>Alternative #1</u>

Align departmental appropriations with expected MNT costs. This alternative is recommended. This alternative allows the State to fulfill its contractual obligations to Qwest as the anchor tenant on the Colorado High-speed Digital Network to succeed. As a result, the benefits to state agencies, local governments, private businesses, and citizens throughout the State can be realized.

Alternative #2

Maintain departmental appropriations at current levels. This alternative is not recommended. This alternative would result in severe negative consequences for the State and for the MNT project. Without an alignment of departmental appropriations with estimated MNT costs, departments would not be able to convert telecommunications traffic to the Multi-Use Network. However, the State is contractually obligated to lease 20 megabits of bandwidth at each ANAP. Therefore, the cost of this bandwidth must be covered regardless of the traffic. As state statutes require the Department to charge the full cost of telecommunication services to user agencies, the MNT rates for existing customers would be increased to cover these costs. This would drive away local government and non-profit customers who can access the private-side of the high-speed digital network, rather than the MNT.

Statutory and Other Authority

Senate Bill 96-102 authorized the Multi-Use Network project

Linkage to Objectives

This request ties to the following objective in the Strategic Plan:

1.4: Annually, identify the appropriate level of funding per service for GSS and client agencies by accurate tracking of utilization data and payments received, and tracking of GSS costs and cost trends.

Recommendation:

Alternative #1 is the recommended approach, as it will help ensure the success of the MNT project and will ensure the State is able to meet contractual obligations with Qwest.

The Legislature and the Governor, through Legislation and Executive Order, have clearly indicated that the MNT project represents an important statewide priority. The State and each local community must recognize their common goal of providing a seamless telecommunications infrastructure throughout the State in order to provide the foundation for electronic government.

The State must take a leadership role in utilizing the MNT network. Thus, it is imperative that state agencies are able to convert telecommunication services to the MNT network and be able to pay for these services. This will provide the foundation utilization levels for the MNT that can be built upon by local government and non-profit traffic.

Failure to support this project will slow development efforts by the MNT public/private partnership and adversely impact the economic development efforts of local communities. Without the MNT, the State's current fragmented network purchasing practices inhibit economies of scale and interoperability of networks. The net effect of this fragmentation is that many rural communities will be left out of the new economy while the State will be unable to provide the necessary foundation for e-government services such as distance learning, high-speed Internet services, and tele-medicine.

Other Key Factors for Decision-Making

MNT Utilization

The anticipated MNT costs for state agencies is dependent on a number of assumptions used to establish billing rates and estimate departmental costs. It was difficult to establish many of these assumptions as the MNT is newly implemented and there is limited historical information.

MNT costs are primarily driven by contractual costs and CGTS personnel costs. Since costs are relatively stable, the primary driver of billing rates is the level of volume used by state agencies, local governments, and non-profits. While there is historical data on telecommunication utilization for state agencies, it is difficult to obtain accurate usage information due to the decentralized nature of telecommunication services. The current volume estimates for data circuits are based upon state accounts identified by Qwest representatives. This is a difficult exercise to identify the numerous circuits accurately. CGTS has been working diligently with state agencies and Qwest to identify accurate circuits and telecommunication utilization. This effort has improved the quality of the information. This information is used as the basis to determine the services to be converted to the MNT network. Future utilization is estimated by projecting the anticipated growth in telecommunication through known projects and systems.

There is almost no available historical information on telecommunication utilization by local governments and non-profits. Furthermore, there is no way to project the level of local and non-profit traffic on the MNT in the future. Local governments and non-profits are able to access the MNT through CGTS. However, they are also able to access the high-speed digital network directly through the Qwest consortium. Depending on the volume of local government and non-profit traffic on the MNT, the MNT rates could substantially fluctuate. In other words, the more local governments and non-profits that access the MNT, the more MNT rates will be reduced. In turn, this will reduce the estimated costs for state agencies.

CGTS is actively engaged in a customer outreach and marketing effort to communicate the benefits of the MNT to local governments and non-profits. This customer outreach and marketing effort is being coordinated with the Department of Local Affairs – Beanpole Project and the Qwest consortium. The response to initial discussions with local governmental groups about the MNT project has been very positive. In addition, CGTS is dedicated to completing the review of state telecommunication circuits with the assistance of Qwest and state agencies to

ensure all state traffic has been identified and attributed properly to the MNT network. If additional traffic were identified, a corresponding decrease in rates would be implemented.

MNT utilization will be monitored on an ongoing basis and rates will be reviewed periodically to determine the possibility of rate reductions.

The Cost of Bridging the Digital Divide

The Colorado High-speed Digital Network could not have been built without the involvement of the State as an anchor tenant. Low-population outlying counties including Baca, Bent, Custer, Otero and Alamosa, will receive the same services as metropolitan counties. Although the cost to provide the service in these areas is significantly higher than the metropolitan area, the potential revenue to offset these costs is miniscule. This results in a significant revenue shortfall. For example, Alamosa would recover approximately $900 per month in revenue, while the Aggregated Network Access Point (ANAP) access fees alone may be $2,500. This disparity is more pronounced in Springfield which will recover approximately $125 per month in revenues, yet may experience an ANAP fee of $9,500 per month.

Cost Neutrality

Originally, the Multi-Use Network was thought to be cost-neutral to the State. This conclusion was based upon the study of historical data that led to several assumptions. Two studies conducted in 1997 and 1998 found that state spending on telecommunications surpassed $15.9 million dollars, excluding higher education spending. Additionally, there were projects not yet complete that would drive substantial telecommunication needs. Original projections had the additional MNT costs totaling $13.5 million annually. These costs would be spread across an estimated 4,000 to 5,000 state circuits.

It appears that the estimated state telecommunication spending included voice and data telecommunication expenses, where only data is being converted to the MNT initially. In addition, it is unclear if the original estimates of circuits included data and voice circuits. It has been determined that the amount of network usage (and therefore the resulting revenue stream) that was initially projected to be run through the MNT does not yet exist. In fact, the most recent inventories show only about 1,600 data circuits being converted to the network. Therefore, each circuit must carry a significantly larger portion of the MNT costs. Additional technology will allow voice to be added to the network in the future.

Assumptions and Calculations –

1. Primary MNT costs, including MNT contractual costs, include the following items:

a. Qwest project management fee $ 250,000

The Qwest and consortium network design, project management and deployment fee covers Qwest contractual commitments to continue deployment of the project as designed by the MNT partnership task group through Phase II and III.

b. Aggregated Network Access Point fee $ 2,244,740

This access fee is fundamental to the MNT network design. Each ANAP provides access to high-speed network service for the communities located in and around each of Colorado's 64 counties. These fees represent charges to the state government, which serves as the "anchor tenant" for the network. Access is extended to all local jurisdictions, K-12 schools, and other non-profit service agencies, which is again fundamental to providing high-speed broadband for each county seat. The ANAP access fee is for 56 operational ANAPs during FY 2002-03. The ANAP access fee will increase to $3,261,404 when all 65 ANAPs are deployed in FY 2003-04.

As "anchor tenant," the State is committed to becoming the major customer at each ANAP at the county seat. During Phase II, the network will have deployed 58 of 70 ANAPs designated in the IMC strategic plan. In essence, Colorado state government, through its respective state agencies has established the business case a private consortium to build-out a full service broadband, ATM, and frame relay network to all counties in Colorado. Thus, the "Colorado digital-divide" will no longer exist and state government will have in place a reserved portion (20 megabits) of the "Colorado High-Speed Digital Network" for government services.

c. State core switch (MGX) management fee $ 624,000
d. State core switch (MGX) maintenance fee $ 234,225

CGTS and the MNT project is committed to providing state-of-the-art reliable network services 24 hours per day, 7 days a week. Complete and total management of the core switches is critical to this objective. This service will be outsourced to an expert provider that has demonstrated experience in managing CISCO carrier class switching, fault management configuration and reporting requirements.

e. State edge site (CISCO 6509) management fee $ 201,696
f. State edge site maintenance fee $ 361,230

At selected customer agency locations, the MNT project is designed to provide ATM technology capable equipment. During Phase II the State will have 41 CISCO 6509 router-concentrators turned on and in service. Management and maintenance of these

critical switching capabilities is a requirement to ensure network reliability and quality-of-service commitments to customers.

g. LATA Crossing, Edge & SANAP circuits $ 406,704

These costs are incurred to provide network backbone services that benefit all customers of the MNT. These services include crossing the LATA (the boundary between the Northern and Southern Colorado telecommunication service areas) and providing the high-capacity Capitol Complex ATM network backbone.

h. ISP State Internet fee $ 216,000

CGTS provides Internet connection capability for all MNT eligible customers including state and local government and non-profit agencies. CGST is a member of the Front Range Gigapop (FRGP) and as such offers the most cost effective Internet access to eligible customers.

2. A summary of the estimated MNT costs for each department and the FY03 decision item to align departmental appropriations with these costs is included below. (see attached)

3. The MNT Rates are included below. (see attached)